MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
WATER QUALITY PROGRAM

Site: Syntex - Verona
ID#: MOD007452154
Break: 17.8
Other:
6-16-75

MEMORANDUM

TO Bob Lindholm FROM James A. Burris 079

SUBJECT Dioxin 2,3,7,8 - Tetrachlorodibenzodioxin Disposal DATE June 16, 1975

Syntex Corporation

As we discussed after our meeting with Syntex on June 5, 1975, I am transmitting some of my thoughts on the subject disposal problem.

Apparently other sources of waste Dioxin exist within the United States, limited study has shown incineration to be one acceptable method. Other methods under study include dilution and/or chemical reaction to rework the product for re-use as a herbicide. This work has been directed at a liquid containing relatively low concentrations of the by-product Dioxine. While we support the re-use of waste materials the material stored by Syntex Corporation is not a liquid and contains concentrations of by-product of Dioxin in the range of 1000 PPM.

We believe that the only practical way to dispose of this tar like material at this time is incineration. However, incineration detention time and temperature are somewhat open to question.

For experimental or trial disposal of Dioxin this material would offer some positive advantages.

1. By it viscous nature transportation and storage hazards would be minimal.
2. High concentrations of Dioxin by-products would improve accuracy in determining incineration efficiency.

I understand that Dr. Wilcom, U.S. Environmental Protection Agency, Kansas City, Missouri, 816-374-3036 and Morris Tucker, EPA, Kansas City, Mo., have been working on disposal. Any assistance or suggestions concerning disposal of this material you may provide would be appreciated.

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40039002
OU-00 SUPERFUND RECORDS

C.C. Godfrey Moll, Syntex Corporation
Central Office

69/7-01448

SYNTEX AGRIBUSINESS, INC.
NUTRITION AND CHEMICAL DIVISION
VERONA PLANT

2/12/75

Storage and Emergency Spill Procedure for Still Residues containing Dioxin
(2,3,7,8 - Tetrachlorodibenzodioxin or TCDD)

Description of Storage:

The distillation residues from the NEPACCO distillation unit D-3 (750-gallon glass lined reactor) were collected for disposal by high temperature incineration in an insulated, steam-heated (presently disconnected) 7,500 gallon steel tank G-7. When NEPACCO ceased operations in January, 1972, they left about 4,300 to 4,600 gallons of this residue in the tank. Preliminary tests by the Center for Disease Control, HEW, PHS at Atlanta, Georgia indicates concentrations of TCDD in the range of 1,000 ppm. This tank has remained inactive and untouched until sampled by Dr. Coleman (Nick) Carter of CDC in August, 1974.

The tank is on a floor level concrete slab adjacent to the west side of Building V-11. A three foot high concrete block dike has been constructed around the tank to preclude stormwater from accumulating or flowing under the tank. It is clearly labeled "Danger-Hazardous Material."

Hazard:

TCDD is extremely toxic. The still residue containing in the range of 1,000 ppm TCDD stored in tank G-7 is very viscous (at room temperature it flows like cold road tar), therefore, it will not readily flow if the tank developed a leak.

Since TCDD can be highly toxic by skin absorption, all personnel assigned to work with accidental spills should be adequately protected against contact and should be instructed to wash down immediately after any such work. Proper protective clothing (rubber gloves, plastic face shields, rubber aprons and boots) must be worn.

Spill Plan:

If any of the residue leaks or is spilled in the diked area or during any transfer for disposal by incineration, the spilled residue is to be absorbed on cob meal and deposited in sealed plastic bags in fiber drums for disposal by proper incineration. It should be labeled "Danger-Hazardous Material" and include the date of the spill, the number of containers, and the names of all individuals who were assigned to the clean-up. All clean-up equipment that comes in contact with the residue should be deposited in sealed plastic bags in fiber drums for disposal by proper incineration also.

These drums will be stored in the small metal building to the west of Building V-11, which will at that time have a sign placed on the door as to the contents of these drums.

Cool on incineration

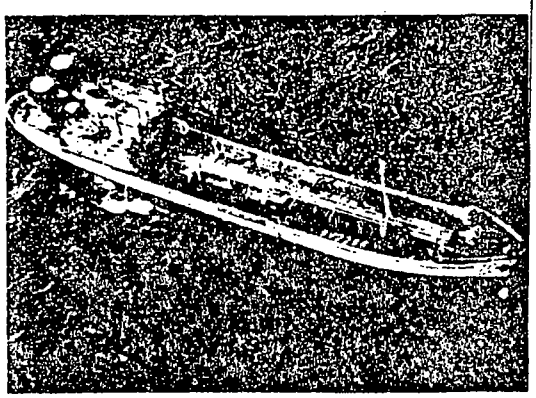
The Environmental Protection Agency last week set aside hearings on an Air Force request to incinerate the herbicide, Agent Orange, on the Dutch vessel *Vulcanus* until EPA chemists can determine whether it would be feasible to reprocess the material as a weed killer.

The Air Force wants to dispose of 2.3 million gal. of the herbicide, which it has had on hand since the material's use as a defoliant in Vietnam was banned about five years ago.

It planned to moor the ship near Johnston Island, about 1,000 miles southwest of Hawaii, but at earlier hearings the government of the U.S. trust territory of Micronesia and environmentalists opposed the plan.

At hearings last week in San Francisco, Jake MacKenzie, Environmental Protection Agency regional chief, said the agency's ocean dumping regulations would prohibit burning as long as other options are open. He added that EPA chemists are optimistic on the reprocessing idea.

The *Vulcanus* is the same vessel used by Shell Chemical to dispose of chlorinated hydrocarbon wastes (*CW, Oct. 23, 1974, p. 24*).



INCINERATOR SHIP 'Vulcanus' will dispose of Air Force's herbicide if EPA approves.

Herbicide 'Orange' Plan Changed by Air Force; EPA Slates a Hearing

The US Air Force has abandoned plans for selling off its stocks of the herbicide "Orange" and is seeking permission from Environmental Protection Agency to incinerate the material at sea.

According to information supplied to EPA, there are approximately 1.4 million gallons of herbicide "Orange" in storage on Johnston Island in the Pacific Ocean and about 860,000 gallons in storage at Gulfport, Miss.

The herbicide consists of approximately 50 percent by volume of the normal butyl ester of 2,4,5-trichlorophenozyacetic (2,4,5-T) acid, and 50 percent by volume of normal butyl ester of 2,4-dichlorophenoxyacetic (2,4-D) acid.

The Air Force intends to incinerate the chemical compound in a location approximately 120 miles from Johnston Island and 850 miles west of the Hawaiian Islands. The chemical wastes would be incinerated at

Continued on Page 33

Herbicide "Orange"

Continued from Page 5

above 1400 degrees Centigrade aboard the "M/T Vulcanus," a vessel recently used by Shell Chemical Company to incinerate organochlorine wastes in the Gulf of Mexico.

A public hearing has been scheduled by EPA for February 19 to consider issues that might be raised in the application of the Air Force, such as feasible alternative methods of disposal; whether herbicide "Orange" is a "chemical" or "biological warfare agent"; whether incineration is feasible and environmentally safe and similar issues.

PROPOSAL 6/5/75

not used

SYNTEX AGRIBUSINESS, INC.
NUTRITION AND CHEMICAL DIVISION
VERONA PLANT

Drum Loading, Storage and Shipping Procedure for Still Residues containing Dioxin
(2,3,7,8 - tetrachlorodibenzodioxin or TCDD)

Description of Storage

The distillation residues from the NEPACCO distillation unit D-3 (750-gallon glass-lined reactor) were collected for disposal by high temperature incineration in an insulated, steam-heated (presently disconnected) 7,500 gallon steel tank G-7. When NEPACCO ceased operations in January, 1972, they left about 4,300 to 4,600 gallons of this residue in the tank. The TCDD concentration has been determined to be at 303 to 356 parts per million in tests conducted at the Center for Disease Control, HEW, PHS at Atlanta, Georgia (Communication dated February 14, 1975 from Dr. Matthew Zack). This tank has remained inactive and untouched until sampled by Dr. Coleman (Nick) Carter of CDC in August, 1974.

The tank is on a floor level concrete slab adjacent to the west side of Building V-11. A three foot high concrete block dike has been constructed around the tank to preclude stormwater from accumulating or flowing under the tank. It is clearly labeled "Danger-Hazardous Material."

Hazard

TCDD is extremely toxic. The Toxic Substances List 1973 Edition, US Dept. of HEW, NIOSH, June 1973, list it as follows: TXDS: orl-rat LD50: 0.01 mg/kg (NATWAY, 232,395,71), which means that a "qualifying toxic dose" given orally to rats in the amount of 0.01 mg/kg of body weight is a lethal concentration to 50% of them (one-half die from this very small amount swallowed in their food or water).

TCDD can be highly toxic by skin absorption. Information from CDC, HEW, PHS at Atlanta, Georgia that skin absorption tests using rabbits indicates a very low lethal concentration.

Personnel Protection

All personnel assigned to work in the packaging of this still residue containing TCDD must wear adequate protective clothing as required by their specific assignment and potential exposure. There will be four work assignments: (See next page, please)

Maintenance Journeyman - When working on the drain connections, hoses and valves, he will wear a face shield (to protect against any accidental discharge), an apron (over a jumpsuit provided by Syntex Agribusiness, Inc.), rubber gloves and rubber boots - all of which will remain at the site of Tank G-7 in a fiber drum for future use or disposal.

Chemical Operator - Drum Filler - Will have the greatest chance for exposure during the filling operation, and therefore, will wear a face shield, an apron (over a jumpsuit provided by Syntex Agribusiness, Inc.), rubber gloves and rubber boots - all of which will remain at the site of Tank G-7.

Chemical Operator - Drum Sealer - Will have the next greatest chance for exposure during the sealing operation, and therefore, will wear a face shield, an apron (over a jumpsuit provided by Syntex Agribusiness, Inc.), rubber gloves and rubber boots - all of which will remain at the site of Tank G-7.

Chemical Operator - Transporter - Will have the least exposure, and therefore, will wear an apron (over a jumpsuit provided by Syntex Agribusiness, Inc.), rubber gloves and rubber boots - all of which will remain at the site of Tank G-7.

Supervision - Those in the immediate area of loading the drums will wear the same equipment as the Chemical Operators. Those at the storage area will dress as usual, but be prepared to don protective clothing in the event an accidental spill (see Spill Procedure dated 2/12/75).

Protective Equipment

Aprons: Synder or Welhener vinyl bib-type aprons and waist aprons (33 by 40 inches)

Face Shield: MSA Sightgard Faceshield with Super-Gard Chipruf Visor

Gloves: Edmont Wilson Redmont neoprene coated heavy duty line (12 inch)

Boots: Neoprene rubber safety-type boots from Wise El Santo.

Procedure

1. Drum filling - There are over 900 5-gallon Galaxee Tight Head Plastic Containers (DOT 34) on hand to receive the still residues. If the weather is clear, we will load the containers out-of-doors adjacent to Tank G-7, if it is rainy we will extend a plastic pipe line over to the electrical shack and do our loading undercover.

    a. The empty labeled containers are placed on a cardboard box cover and filled from a gasoline hose and nozzle connected to the side outlet of Tank G-7 by the Drum Filler.

        Extreme care must be taken to keep drips off the outside of the containers and all other items.

Procedure continued:

b. The Drum Sealer screws on the 70MM Screw Cap, checks the label (Poison), places the container in a protective plastic bag and ties it off. He sets the container on a hand truck for removal to the storage area.

c. The Transporter provides the empty containers, caps and plastic bags to the Drum Filler and Drum Sealer and hand wheels the filled containers to the storage area. He places the filled containers in a cardboard box cover on a new skid and as the skids are filled (12 containers) he covers them with plastic sheeting to protect against rain. The containers are also banded to prevent excessive movement during transportation.

2. Storage - A total of 38 skids with 12 containers each will be stored on the concrete slab on the south side of building V-11. All will be covered with plastic sheeting and will be roped off against contact by a Fork Truck. The Spill Procedure dated 2/12/75 will apply to this storage area also.

3. Truck Loading - A clean truck provided by Pollution Control, Inc. will arrive on Monday, May 12th and again on Monday, May 19th to be loaded out. The Toyota Fork truck will be used to place ten skids on each side and top rows of nine each placed on top of a half-inch thick four by eight foot plywood sheet to distribute the weight evenly upon the containers of the lower two rows.

4. Special Notes - At no time will the unloading of the tank take place without a fully equipped Supervisor being on hand to assist in the event of an accident.

a. Any item coming in contact with the still residues (including plastic pipe, hoses, valves and pumps) will be placed in sealed plastic bags in fiber drums marked "Danger - Hazardous Material" for disposal by proper incineration.

b. Any spills will be absorbed immediately on Cob Meal and placed in sealed plastic bags in fiber drums marked "Danger - Hazardous Material for disposal by proper incineration".

c. The truck will be provided with 400 pounds of Cob Meal and four 41-gallon Lever Pak drums to be used on any spills detected during transfer by PCI. Protective equipment will also be made available to the driver, if necessary.

d. All containers will be labeled with an approved DOT Poison Label including From: Syntex Agribusiness, Inc., Springfield, Missouri, (417) 866-7291 and To: Pollution Control, Inc., Shakopee, Minnesota (612) 445-1086 and DO NOT TOUCH CONTENTS.

Procedure continued:

e. Each truck will be followed by a Syntex Agribusiness technical personnel in a company station wagon equipped to assist in any emergency that might arise during the movement of the material to PCI's premises.

f. When the level of the still residues is down to the side outlet we will hand pump out the remaining material. If there are to be any washing of the tanks, a separate procedure will be written. Samples of any washings will be taken and sent to CDC for assay to determine TCDD content.

Godfrey J. Moll
Vice President, Operations

GJM/dm
May 6, 1975

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333
TELEPHONE: (404) 633-3311

rec. 10/11/74

October 2, 1974

H. Denny Donnell, Jr., M.D.
Division of Health
Missouri Department of
Health and Welfare
State Office Building
Jefferson City, Missouri 65101

Dear Dr. Donnell:

As you know, the investigation being conducted by the Missouri Department of Health and the Center for Disease Control (CDC) concerning the contamination of horse arena soil by 2,3,7,8-tetrachlorodibenzodioxin (TCDD), has identified a source of distillate residues containing very high concentrations of TCDD. Preliminary toxicologic analyses of these residues here at CDC indicate concentrations of TCDD in the range of 1000 ppm. For the past 3 years, these residues have remained untouched in a storage tank on the premises of Hoffman-Taff of Verona, Missouri, a subsidiary of Syntex Agribusiness, Incorporated. Because of the extreme toxicity of TCDD, we feel that it is important for the public safety that this material be promptly and safely destroyed.

based on info supplied to them by phone

TCDD is a very stable compound which requires incineration at temperatures exceeding 800 degrees centigrade at exposure times exceeding 30 seconds for proper disposal. This incineration should be performed in a properly constructed incinerator capable of achieving these conditions. We recommend utilizing this means of disposal through a reputable service company capable of handling this material in the safest possible manner. Any company contracting for this service should be clearly informed of the nature, concentration, and toxicity of the material in question. Prior to disposal, we would advise that they consult with the Dow Chemical Co., Midland, Michigan, which has had substantial experience in disposing of TCDD-contaminated waste.

Once as much as possible of the tank's contents has been safely and properly removed, we feel that the tank itself should be sealed and deep-buried at a site remote from drainage systems and other potential sources of human exposure and where subsequent unearthing will not occur. Prior to burial, the tank should be carefully sealed and properly marked with respect to its residual contents and toxicity. Other means of disposing of the tank do not preclude the possibility of human exposure either immediately or at some distant point in time. In particular, since TCDD is relatively insoluble and since the residue is a thick, tarry substance, cleaning or decontamination

of the tank does not seem to be a realistic alternative to deep-burial. The immediate surroundings of the storage tank should be inspected after its removal, and concrete, pipes, or other objects that appear contaminated with the residue should be dealt with in a manner similar to that described for the tank.

While TCDD is not a volatile compound, it can be highly toxic by skin absorption. Its toxicity cannot be overemphasized, particularly since its concentration in the residue in question appears to be extremely high. We are therefore very concerned that all persons involved in the removal of this waste material be properly informed as to its hazard and that adequate safeguards be provided before disposal is attempted. We would appreciate your informing us of any action taken to effect disposal. As you know, the investigation in collaboration with your Division is continuing; as in the past, we will stay in close contact with you regarding further developments.

Sincerely yours,

Clark W. Heath, Jr.

Clark W. Heath, Jr., M.D., Director
Cancer and Birth Defects Division
Bureau of Epidemiology

cc: Dr. Herbert R. Domke
Dr. Patrick Phillips - Mo. Dept. of Health (314)-751-2782
Mr. Godfrey J. Moll
Mr. Edwin B. Michaels
Mr. Glen E. Schweitzer
Dr. Gene Wallen
Mr. William F. Barthel
Dr. Philip Landrigan
Dr. Renate Kimbrough
Dr. David Firestone
Dr. Coleman D. Carter "Nick"? (404)-633-3311 EXT. 3987 CDC Atlanta
Dr. Philip Brachman

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

TD:

Mr. Godfrey J. Moll, Vice-President
Hoffman-Taff, Incorporated
P.O. Box 1246 SSS
Springfield, Missouri 65805

rec. 2/20/75

February 14, 1975

Wally Jordan
Rollins Environmental Service Co.
Box 73877
Baton Rouge, Louisiana 70807

Dear Mr. Jordan:

This letter follows up our phone conversation of February 12, 1975 about the proper disposal of the waste residue in a storage tank at Syntex's plant in Verona, Missouri.

The tank is estimated to contain between 4,000 and 5,000 gallons of a very viscous distillate residue formed during 2,4,5-trichlorophenol production four years ago. The residue is a complex mixture of chlorinated hydrocarbons including 2,4,5-trichlorophenol and 2,3,7,8-tetrachlorodibenzodioxin (TCDD). The TCDD concentration has been revised downwards since we talked to 303-356 parts per million.

Chemically, TCDD is nonvolatile at room temperatures, has a high specific gravity, and is soluble in chlorinated benzenes, benzene, acetone, and diesel oil. TCDD contaminated transport tanks and pipes may be difficult to clean up. Workers exposed to TCDD contaminated areas, after attempts to decontaminate these areas, continued to develop chloracne.

Chloracne, a severe and persistent form of acne, is the most common toxic effect associated with TCDD (see enclosed reprint). Liver damage is another, more serious effect. TCDD can be absorbed through the skin. In animal experiments done here, an extract of the storage tank residue killed rabbits within a week after it was applied to the skin of their ears.

Disposal of this residue may be less hazardous if you consider the following:

1) The residue is very viscous and may be hard to remove completely from the storage tank or your own tank truck. Other organic wastes you haul in the truck may remove any TCDD adhering to its inner tank surface, but cleaning your tank and transport pipes with diesel oil and incinerating this oil are recommended as a further precaution. (The 30 second incinerator retention time mentioned in our letter to Syntex is incorrect: 1-1½ seconds should suffice)

2) Avoiding skin contact with the residue is important. Wash off any residue from the skin immediately. If disposable gloves and uniforms are available, use them, put them in sealed plastic bags after use, and incinerate them and the bags with the residue.

3) TCDD is nonvolatile at room temperatures, but some of the other components in the residue may cause fumes. Your usual precautions against inhaling fumes should suffice.

If you have any further questions, feel free to call. I would appreciate your report on what you did with the residue. You may get further information on TCDD disposal from John Davison (phone number 517-636-4826) of Dow Chemical Company, Midland, Michigan.

Sincerely yours,

Matthew Zack, M.D.

Matthew Zack, M.D.

MMZ:kk

cc: Dr. Carter
Godfrey Mull

enclosure

SYNTEX ● DIOXIN - SYNTEX ●

PCI

MPCA - ~~PCA~~ - 100 LB SLUGS CAPALE
(4600 GAL. NOW AT VERONA)
12-15,000 GAL SPREAD IN 1971

1. DIOXIN TO YARD FILL (MINN. PLANT OF PCI)

CDC IN GEORGA SAID A 800 C° AT 30 SEC. 10-74 TIME DETENTION TIME

7500 GAL. TANK IN VERONA

CDS ~~AA~~ SAID LATER 2-75 DET. TIME OF 1. TO 1½ SEC.

DILUTION AND USE AS HERBACIDE

GOV. HAS 2.3 MILLION GALLON

~~AA~~ NEPACCO PRODUCED MATERIAL
P.O. 270
STMFORD CONN. 06904
203-853-0016

EWIN B ~~B~~ MICHAELS PRES.

SCHULTON N.J. BY PRODUCT FROM NEPACCO,

III B, A

Comes to

→ IV A
→ V A3
→ VII
→ VIII A, D
IX